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should always appear double, the apparent components nearly vertical to the belts of *Jupiter*; when it transits a dark belt it should always appear elongated in a line nearly parallel to the belts of *Jupiter*. If it is actually double the elongation or line of apparent duplicity should be seen under all angles.

In reference to the other satellites I have seen nothing to indicate a belt on either of them. I am certain there is nothing of the kind on the 3rd. Though I have often noticed an irregular dark marking on this satellite, I have seen nothing to indicate a belt.

Mount Hamilton:
1891 *August* 6.

Observations of the Solar Eclipse of 1891 *June* 6, *made at the Royal Observatory, Greenwich.*

(*Communicated by the Astronomer-Royal.*)

Observations of the Beginning of the Eclipse.

	G.M.T.				Instrument.	Aperture in ins.	Power.	Observer.
1891.	d	h	m	s				
June	6	5	2	29·3	S.E. Equat.	12·8	295	A.D.
		5	2	24·0	E. Equat.	6·7	220	L.
		5	2	11·7	Altaz.	4	100	A.C.
		5	2	36·0	Simms No. 1	4	75	S.D.

No observations of the end of the Eclipse were made, the Sun being hidden by clouds at the time.

The initials A. D., L., A. C., and S. D. are those of Mr. Downing, Mr. Lewis, Mr. Crommelin, and Mr. Dolman respectively.

During the progress of the Eclipse observations were made with the South-East Equatoreal, with the object of determining corrections to the Moon's tabular R.A. and N.P.D., and to the tabular semidiameters of the Sun and Moon.

The circumstances of this Eclipse were, however, not favourable for determination of corrections to the semidiameters.

The following measures were made by Mr. Downing, the declination microscopes being read by Mr. Thackeray:—

Putting—

$d\alpha$ = correction to Moon's R.A.

$d\delta$ = correction to Moon's N.P.D.

ds = correction to Moon's semidiameter

dA = correction to Sun's R.A.

$d\Delta$ = correction to Sun's N.P.D.

dS = correction to Sun's semidiameter

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(1) From $5^h\ 14^m\ 24^s$ to $5^h\ 16^m\ 49^s$ G.M.T. 2 differences of N.P.D. of *p* and *f* cusps were observed, giving

$$+\tfrac{1}{4}da + d\delta + \tfrac{5}{4}dS + \tfrac{5}{4}ds.$$

(2) From $5^h\ 19^m\ 44^s$ to $5^h\ 33^m\ 13^s$ G.M.T. 5 differences of R.A. of *p* and *f* cusps were observed, giving

$$+da + d\delta + 2dS + 2ds.$$

(3) From $5^h\ 35^m\ 6^s$ to $5^h\ 42^m\ 40^s$ G.M.T. 7 differences of N.P.D. of south limbs of Sun and Moon were observed, giving

$$-d\delta + dS - ds.$$

(4) From $6^h\ 1^m\ 35^s$ to $6^h\ 7^m\ 52^s$ G.M.T. 3 differences of R.A. of *p* and *f* cusps were observed, giving

$$-\tfrac{1}{2}da + \tfrac{3}{2}d\delta + 2dS + 2ds.$$

Four resulting equations were found by taking the sums of the constituent equations in each group, obtained by a comparison of the measured with the tabular quantity as affected by the symbolical corrections $da - dA$, $d\delta - d\Delta$, ds and dS :—

$$\begin{array}{rllll}
-13^{\prime\prime}{\cdot}52 = & +0{\cdot}511\,(da-dA) & +2{\cdot}271\,(d\delta-d\Delta) & +2{\cdot}446ds & +2{\cdot}478dS \\
-31{\cdot}24 = & +4{\cdot}743 & +6{\cdot}035 & +9{\cdot}137 & +9{\cdot}267 \\
+13{\cdot}77 = & & -7{\cdot}000 & -7{\cdot}000 & +7{\cdot}000 \\
-32{\cdot}98 = & -2{\cdot}017 & +4{\cdot}171 & +5{\cdot}555 & +5{\cdot}620
\end{array}$$

the solution of which is

$$\begin{aligned}
da - dA &= +2^{\prime\prime}{\cdot}306 \\
d\delta - d\Delta &= -5{\cdot}204 \\
ds &= +1{\cdot}043 \\
dS &= -2{\cdot}192
\end{aligned}$$

From observations of the Sun made on eight days between 1891 May 28 and June 13 :

$$dA = -1^{\prime\prime}{\cdot}50 \qquad d\Delta = -0^{\prime\prime}{\cdot}33$$

Combining this result with that obtained from the equatorial observations during the eclipse, we obtain for the corrections to the tabular place of the Moon in R.A. and N.P.D. and to the tabular semidiameters of the Moon and Sun :—

$$\begin{aligned}
da &= +0^{\prime\prime}{\cdot}80 = +0^{s}{\cdot}053 \\
d\delta &= -5{\cdot}53 \\
ds &= +1{\cdot}04 \\
dS &= -2{\cdot}19
\end{aligned}$$

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From five transits of the Sun's diameter made on the afternoon of June 15, and ten measures of the diameter in N.P.D. made on the afternoon of June 17, with the same instrument and by the same observers, the apparent corrections to the tabular semidiameter of the Sun were found to be:—

$$\text{in R.A.} = -0^{s}{\cdot}029 = -0''{\cdot}40$$
$$\text{in N.P.D.} = \qquad -1{\cdot}01$$

The telescope of the south-east equatoreal has an aperture of 12·8 inches, and a magnifying power of 295 was used.

Advantage was also taken of the circumstance that both the following vertical and lower horizontal limbs of the Moon were in turn projected on the Sun to take an altazimuth observation in the ordinary way. A correction of $-3''$ was applied to the interpolated tabular semidiameter of the Moon, and the corrections to tabular R.A. and N.P.D. of the Moon were then deduced as $-0^{s}{\cdot}40$ and $-5''{\cdot}0$.

Applying the corrections to tabular places and semidiameters indicated by the south-east equatoreal observations, a computation was made of the time of geometrical first contact, which gave $5^{h}\ 2^{m}\ 4^{s}$ G.M.T., the N.A. time being $5^{h}\ 2^{m}{\cdot}2$.

The weather was very unfavourable during the eclipse. Most of the observations were made through cloud, and the cusps and limbs were sometimes very faint indeed and difficult to observe.

Royal Observatory, Greenwich:
1891 *August* 7.

Observations of the Transit of Mercury, 1891 *May* 10.

By W. J. Macdonnell.

I forward a few notes on the Transit of *Mercury* as observed here with a 6-inch Equatoreal Refractor, by Grubb, of Dublin. The geographical position of Port Macquarie is South Latitude 31° 27′, East Longitude $10^{h}\ 11^{m}\ 40^{s}{\cdot}41$ ($6^{m}\ 49^{s}{\cdot}60$ East of Sydney).

May 10 was a clear, bright day, but definition was disturbed, the Sun's limb boiling and very unsteady. The times were taken from a sidereal clock in local sidereal time, and reduced to Sydney Mean Time, the clock error being found from star transits on the evening before and after the Transit of *Mercury*.

Ingress.

	h	m	s	
First Contact	9	59	30	Noted a little too late, perhaps about 20 seconds. ☉'s limb very unsteady.
Second Contact	10	4	4	No black drop, but a hazy ligament formed; the time noted was the appearance of a light between *Mercury* and Sun.